Hearing before the Assembly Committees on Natural Resources and Utilities & Commerce
Testimony of Angela Haren, Program Director, California Coastkeeper Alliance[1]
"Once–Through Cooling, Air Emission Credits and Electrical Generation"
Monday, March 2, 2008
State Capitol, Room 4202

SUMMARY - CALIFORNIA SHOULD ACT PROMPTLY TO PHASE OUT ONCE-THROUGH COOLING

- **California is long overdue for a statewide policy on once-through cooling (OTC) that protects our marine and estuarine ecosystems.** It has been over thirty-five years since the Clean Water Act required that "cooling water intake structures reflect the best technology available for minimizing adverse environmental impact," and three years since the Ocean Protection Council and the State Lands Commission passed unanimous resolutions calling for the expeditious phase-out of once-through cooling.

- **Multiple state and federal agencies** including the State Water Resources Control Board, U.S. Environmental Protection Agency, California Energy Commission, State Lands Commission, and Ocean Protection Council **have recognized the devastating impacts of once-through cooling**.

- **The 19 California plants using OTC combined are permitted to withdraw up to 16 billion gallons of sea water every day and kill an estimated 79 billion fish and other marine life annually**, **including threatened and endangered species such as Delta smelt**.[2] While we wait for a statewide policy, the daily assault on our invaluable marine and Delta ecosystems continues.

- **Once-through cooling has significant impact on the San Francisco Bay-Delta Estuary. All of the imperiled salmon species that migrate through the Sacramento and San Joaquin River watersheds pass the intakes for two aging power plants.**[3]

- **These concerns were echoed in a 2007 Notice of Intent to Sue for Violations of the Endangered Species Act by numerous water districts**, who raised legal concerns about the harm caused by the OTC systems at two Delta powers plants on "endangered Sacramento winter-run chinook salmon, threatened Central Valley spring-run chinook salmon, threatened Central Valley steelhead and threatened delta smelt." **The water districts' 60-Day Notice stated that "[c]ooling**

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[2] State Water Resources Control Board, "Scoping Document: Water Quality Control Policy on the Use of Coastal and Estuarine Waters for Power Plant Cooling (March 2008)" at p.1. ("2008 Scoping Document"). Available at: http://www.waterboards.ca.gov/plans_policies/docs/coastal_estuarine/scope_doc031808.pdf.
[3] Environmental Protection Agency "Case Study Analysis for the Proposed Section 316(b) Phase II Existing Facilities Rule, Part E: San Francisco Bay/Delta Estuary," p. E3-15 (February 28, 2002). EPA 821-R-02-2002.

water intake structures directly and indirectly cause a number of detrimental effects on fish populations," resulting in "illegal take" of those fish.[4]

- **Phasing out once-through cooling has multiple environmental benefits**. By phasing out this destructive technology, the State would better protect its marine and Delta ecosystems while advancing to greener and more energy efficient energy production.

- Years of federal and state action on OTC, including numerous studies, agency resolutions, and draft policies, underscore that **the question is not *if* we should stop using once-through cooling, but how to it phase out statewide on a timeline that protects our ecosystems and advances sustainable energy generation.** We can "effectively eliminate[e]" any reliability concerns through proper planning,[5] and reach for ***both*** of California's landmark goals of sustainable energy and healthy ocean and Delta ecosystems.

1. MULTIPLE FEDERAL AND STATE AGENCIES RECOGNIZE ONCE-THROUGH COOLING'S SIGNIFICANT BIOLOGICAL IMPACTS

- Once-through cooling is an antiquated, World War II-era technology currently in use at 19 coastal and bay-side power plants in California. The process pulls in cold seawater and bay water to cool power plants, killing essentially everything alive in the water that passes through the plants. Combined, these plants are permitted to withdraw up to 16 billion gallons of sea water every day.

- **The State Water Resources Control Board (State Water Board) estimates that these plants kill over 79 billion fish and other marine life annually** through entrainment (which kills larvae and small fish pulled into the plant) and impingement (which injures and kills larger fish, sea turtles, and marine mammals trapped on the intake screens).[6]

- After a thorough review of the extensive rulemaking record for implementation of section 316(b) of the federal Clean Water Act, the **U.S. Environmental Protection Agency (U.S. EPA) determined that there are multiple types of undesirable and unacceptable environmental impacts associated with once-through cooling** including: reductions of threatened and endangered species; damage to critical aquatic organisms, including important elements of the food chain; diminishment of a population's compensatory reserve; losses to populations including reductions of indigenous species populations, commercial fisheries stocks, and recreational fisheries; and stresses to overall communities and ecosystems as evidenced by reductions in diversity or other changes in system structure and function.[7]

- **The California Energy Commission (CEC) has identified once-through cooling as a contributing factor to the degradation of California's fisheries, estuaries, bays and coastal**

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[4] Nossaman, Gunther, Knox and Elliott, LLP, "Notice of Intent to Sue for Violations of the Endangered Species Act" (Sept. 27, 2007). Available at http://www.sustainabledelta.com/pdf/legal-092707.pdf.

[5] ICF Jones & Stokes, *Electric Grid Reliability Impacts from Regulation of Once-Through Cooling in California*, prepared for California Ocean Protection Council, April 2008, p. 12. ("Grid Reliability Impacts"). Available at: http://www.waterboards.ca.gov/water_issues/programs/tmdl/docs/power_plant_cooling/reliability_study.pdf.

[6] 2008 Scoping Document, *supra* n. 2 at p. 1.

[7] California Ocean Protection Council, "Resolution of the California Ocean Protection Council Regarding the Use of Once-Through Cooling Technologies in Coastal Waters." Available at: http://resources.ca.gov/copc/docs/060418_OTC_resolution_LH2_adopted_2006-4-20.pdf.

waters.[8] CEC staff also testified before the State Water Board that "[o]nce-through cooling is a major, ongoing environmental issue with California power plants," with "potentially widespread" cumulative effects in Santa Monica Bay and the SF-Bay Delta Estuary in particular.[9]

- **Once-through cooling has caused significant, ongoing harm to California's marine and estuarine ecosystems for decades**. **For example**, **all of the imperiled salmon species that migrate through the Sacramento and San Joaquin River watersheds pass the intakes for two aging power plants on the San Francisco Bay-Delta Estuary.**[10] Records for both of these plants show that they have killed endangered species, including the Delta smelt and the Chinook salmon.[11]

- Turning on one coastal power plant (San Onofre) destroyed over two hundred acres (59,000 kelp plants) of kelp forest. This, in turn, caused the displacement or death of thousands of individuals from numerous other species. In total it is estimated that the kelp fish population in the area has declined by 80%, all due to that single plant.[12]

- In bays such as Santa Monica, Monterey, and San Diego, and estuaries such as Elkhorn Slough, the impacts from once-through cooling can be more pronounced due to the high biological productivity of these areas and the concentration of the power plants' impacts in light of the area affected. For example, **in Santa Monica Bay three power plants using once-through cooling (Scattergood, El Segundo, and Redondo Generating Stations) cycle 13-percent of the Bay's water every six weeks**.[13]

- The most significant impact is on fish larvae, which support healthy ocean fish populations. The peak larval abundance generally occurs during the summer months, when peak demand for energy (and peak use of OTC) is also at its highest.[14]

- In 2008, **thirteen power plants in Southern California filed incidental take permits with the National Marine Fisheries Service under the Marine Mammal Protection Act, asking for permission to kill and injure marine mammals, including California sea lions, harbor seals, and northern elephant seals, in their OTC systems**.[15] San Onofre Nuclear Generating Station estimates that it will kill an average of 14 California sea lions and six harbor seals per year in its once-through cooling system, while Scattergood reports that over a 17-year period, it entrained 69 California sea lions in its once-through cooling system, 55 of which died.[16]

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[8] California Energy Commission, "*Issues and Environmental Impacts Associated with Once-Through Cooling at California's Power Plants*, California Energy Commission Staff Report Prepared in Support of the 2005 Integrated Energy Policy Report, June 2005", CEC Report No. 700-2005-013. ("Issues and Environmental Impacts Associated With Once-Through Cooling").

[9] California Energy Commission, Presentation to SWRCB (Sept. 26, 2005). Available at: http://www.waterboards.ca.gov/plnspols/docs/pres_cecmckinney.pdf.

[10] Environmental Protection Agency "Case Study Analysis for the Proposed Section 316(b) Phase II Existing Facilities Rule, Part E: San Francisco Bay/Delta Estuary", p. E3-15 (February 28, 2002). EPA 821-R-02-2002.

[11] *Id.*

[12] UN Atlas of the Oceans (2002), http://www.oceansatlas.org; *see also* CA Dep't of Fish and Game, "California's Living Marine Resources: A Status Report" (Dec. 2001).

[13] Issues and Environmental Impacts Associated With Once Through Cooling, *supra* n. 8.

[14] Michael Foster & John Steinbeck "Compilation of California Coastal Power Plant Entrainment and Impingement Estimates for California State Water Resources Control Board Staff Draft Issue Paper on Once-through Cooling." Available at: http://www.swrcb.ca.gov/water_issues/programs/npdes/docs/cwa316b/ca_powerplant_steinbeck070208.pdf.

[15] Federal Register: February 20, 2008 (Vol. 73, No. 34).

[16] *Id*.

2. U.S. EPA AND THE STATE OF CALIFORNIA HAVE TAKEN NUMEROUS ACTIONS IN RECENT YEARS TO PHASE OUT ONCE-THROUGH COOLING IN CALIFORNIA

1972

- **Congress passes the federal Clean Water Act** including section 316(b), which provides that "any standard established pursuant to [CWA §§ 301 or 306] and applicable to a point source shall require that the location, design, construction and capacity of cooling water intake structures reflect the best technology available for minimizing adverse environmental impact."

2001

- The U.S. EPA issues regulations for once-through cooling systems at *new* power plants (known as the 316(b) Phase I Rule).

2002

- Environmental groups file a lawsuit challenging the U.S. EPA Phase I Rule regarding new power plants (*Riverkeeper I*).

2004

- The Second Circuit Court of Appeals agrees with plaintiffs in the *Riverkeeper I* case, ruling that **the use off off-site restoration as mitigation for once-through cooling for new plants does not conform to the Clean Water Act.**[17]

- **The U.S. EPA issues regulations for once-through cooling systems at *existing* large power plants (known as the 316(b) Phase II Rule).** Regulations establish a series of "best technology available" compliance options that create such a wide latitude for power plant owners to comply that essentially no reduction in impacts appears likely.

- Environmental groups challenge the U.S. EPA Phase II Rule regarding existing large power plants *(Riverkeeper II)*. California Coastkeeper Alliance is a co-plaintiff in the case.

- The **California Legislature passes the Ocean Protection Act** establishing the Ocean Protection Council (OPC), which is charged with coordinating actions of state agencies with regulatory authority over marine resources to improve the state of ocean ecosystems.

2005

- **The State Water Board**, which has Clean Water Act authority to regulate once-through cooling, initiates a public proceeding to determine if the U.S. EPA's Phase II Rule regarding existing power plants meets California's environmental policy objectives or if a new California rule is needed.

- **The CEC finds that once-through cooling "contribute(s) to the decline of fisheries and the degradation of bay and coastal waters**" in its *2005 Integrated Energy Policy Report* and directs staff to work with other state agencies to address once-through cooling issues. [18]

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[17] *Riverkeeper v. U.S. EPA*, 358 F.3d 74 (2d.Cir. 2004).

[18] California Energy Commission, "2005 Integrated Energy Policy Report" #CEC-100-2005-007-ES, (Nov. 2005) p.147. ("2005 Integrated Energy Policy Report"). Available at http://www.energy.ca.gov/2005_energypolicy/.

2006

- **The OPC and the State Lands Commission (SLC) both pass unanimous resolutions calling for the expeditious phase-out of once-through cooling in California due to the environmental damages it causes.**[19] The OPC "[r]esolves to urge the State Water Resources Control Board to implement Section 316(b) and more stringent state requirements requiring reductions in entrainment and impingement at existing coastal power plants and encourages the State to implement the most protective controls to achieve a *90-95 percent reduction in impacts*."[20]

- State Water Board staff releases the first Scoping Document and Proposed Statewide Policy for implementing the EPA's Clean Water Act 316(b) regulations addressing once-through cooling.[21]

2007

- **The Second Circuit Court of Appeals rules in the *Riverkeeper II* case** regarding existing power plants that: (1) EPA's Phase II regulations for existing facilities fail to require the "best technology available," which is the standard that must be implemented; (2) "Cost-benefit" analysis cannot be used in determining Section 316(b) performance standards; (3) Percent ranges to meet performance standards cannot be used unless based on "best technology available"; and (4) Restoration measures cannot be used as a substitute for technology standards required under Section 316(b).[22]

- In response to the Second Circuit decision, the **US EPA formally suspends its 316(b) Phase II regulations for existing power plants and directs the Regional Administrators to institute "best professional judgment" regarding permits under section 316(b) of the Clean Water Act.**[23] Despite this clear directive to reissue permits consistent with Section 316(b), 15 of the 19 plants continue to run with expired NPDES permits.

- **California Independent System Operator (Cal ISO) releases a draft study finding that the old coastal steam generator plants "tend to have higher heat rates than newer combined-cycle generating plants, and that they also tend to have higher green house gas emission rates and other pollutants than new generation sources**."[24] The study added that it is likely that "[a] mix of scenarios will be developed that will include retirement/replacement of old thermal generation, development of new generation (particularly renewable generation) and related reinforcement of the electric transmission system."[25]

- **A coalition of water districts filed a 60-day notice** letter to Mirant, the U.S. Army Corps of Engineers and others regarding Endangered Species Act violations at Mirant's Contra Costa and Pittsburg power plants in the Bay-Delta, alleging that the once-through cooling system "directly

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[19] State Lands Commission Resolution available at: http://archives.slc.ca.gov/Meeting_Summaries/2006_Documents/04-17-06/ITEMSANDEXHIBITS/R71ExhA.pdf and Ocean Protection Council resolution available at: http://resources.ca.gov/copc/docs/060418_OTC_resolution_LH2_adopted_2006-4-20.pdf.

[20] *Id.*

[21] Available at: http://www.swrcb.ca.gov/npdes/docs/cwa316b/316b_scoping.pdf.

[22] *Riverkeeper, Inc. v. U.S. EPA*, 475 F.3d 84 (2d Cir. 2007).

[23] Memorandum from Benjamin Grumbles, Assistant Administrator, U.S. EPA to U.S. EPA Regional Administrators, "Implementation of the Decision in *Riverkeeper, Inc. v. EPA*, Remanding the Cooling Water Intake Structures Phase II Regulation" (March 20, 2007).

[24] California Independent System Operator, *Old Thermal Generation Retirement and Replacement of Once-Thru Cooling Long-Term Transmission Planning Study Version 2.0* "Mitigation of Reliance on Old Thermal Generation Including Those Using Once-Thru Cooling Systems Study Plan Draft Version 2.0," p.1 ("Old Thermal Generation Retirement and Replacement"). Available at: http://www.caiso.com/1c58/1c58e92e2cc30.pdf.

[25] *Id.*

and indirectly cause a number of detrimental effects on fish populations, including the Sacramento winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, and delta smelt."[26]

2008

- **OPC releases technical feasibility study** that specifically evaluates the feasibility of retrofitting 15 plants once-through cooled plants (repowering was not addressed). Of the fifteen plants studied, 12 were deemed technically and logistically able to retrofit to closed-cycle wet cooling, including the two nuclear facilities.[27] Although the study finds that retrofitting three of the plants is not feasible, repowering or retirement of the plants were not evaluated and may well be viable options. For example, although the OPC feasibility study finds that retrofitting at El Segundo Generating Station to a closed-cycle wet cooling system "poses several challenges,"[28] the owner of the plant, NRG Energy, submitted a request to relicense the plant using air cooling, demonstrating that repowering is both feasible and preferable.[29]

- **State Water Board staff releases second Scoping Document and Proposed Statewide Policy** regarding once through cooling, outlining a phase-out approach requiring plants with a capacity utilization rate of 20% or less to comply by 2015, plants with a capacity utilization rate of 20% or greater to comply by 2018, and the nuclear plants to comply by 2021.[30]

- The OPC releases ***Electric Grid Reliability Impacts from Regulation of Once-Through Cooling in California***, finding that **under "all but the most extreme scenarios, more than enough power plants are expected to be operating in 2015 to more than compensate for any or all once-through cooling plant retirements**."[31]

- **The Supreme Court grants certiorari in the *Riverkeeper II* case** on the question of whether section 316(b) of the Clean Water Act authorizes the U.S. EPA to compare costs with benefits in determining the best technology available for minimizing adverse environmental impact at cooling water intake structures. A ruling is expected in spring 2009.

3. PROTECTING OUR COASTAL & ESTUARINE ECOSYSTEMS IS FULLY CONSISTENT WITH ENSURING A SUSTAINABLE ENERGY SUPPLY FOR CALIFORNIA.

- According to data published by the CEC, combined the 19 OTC plants have a capacity of approximately 21,250 MW.[32] Over three-quarters of the steam boiler power plants using OTC were used at less than 20% of their operating capacity in 2006 (see attachment one for CEC table).[33]

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[26] Nossaman, Gunther, Knox and Elliott, LLP, "Notice of Intent to Sue for Violations of the Endangered Species Act" (Sept. 27, 2007). Available at http://www.sustainabledelta.com/pdf/legal-092707.pdf.

[27] Tetra Tech, Inc. "California's Coastal Power Plants: Alternative Cooling System Analysis" Prepared for the Ocean Protection Council. Feb. 2008. ("Alternative Cooling System Analysis"). Available at: http://www.resources.ca.gov/copc/CCPP_ACSA.htm.

[28] *Id*. at p. D-1.

[29] Petition to Amend the Final Commission Decision for the El Segundo Power Redevelopment Project, CEC-800-2005-001-CMF, June 2007, p. 2-2 and Figures 2.1-1, 2.1-2a, and 2.1-2b (proposes repowering to closed cycle dry cooling system at Units 1 & 2).

[30] 2008 Scoping Document, *supra* n. 2.

[31] Grid Reliability Impacts, *supra* n. 5,at p. 3.

[32] California Energy Commission, *2007 Environmental Performance Report of California's Electrical Generation System*, Draft Staff Report, CEC Report No. 700-2007-016-SD, ("2007 Environmental Performance Report") at p. 54. Available at*:* http://www.energy.ca.gov/2007publications/CEC-700-2007-016/CEC-700-2007-016-SD.PDF.

- **Only a handful of the coastal plants were considered as essential by the California ISO in 2007 to ensure grid reliability.**[34] The plants include: Encina and South Bay in San Diego, Potrero and Contra Costa Unit 4 & 5 in the Bay Area, and Humboldt in Northern California. **However, all of these plants are already slated for replacement**.[35]

- **The power plant operators have demonstrated that repowering is often a preferred alternative that offers an opportunity to solve multiple environmental impacts and improve energy efficiency**. To date four power plants - including El Segundo, Encina, Humboldt and Gateway- have announced their intention to repower to combined-cycle operation without the use of once-through cooling.[36] Additionally, approximately 3,000 MW of new combined cycle replacement projects have been permitted at coastal steam boiler plants.[37]

- The OPC-funded technical feasibility study found that **retrofitting the two nuclear plants, San Onofre and Diablo Canyon is technically and logistically feasible.**[38]

- **Other states and regions are aggressively pursuing nuclear plant wet tower retrofits.** The New York Department of Environmental Conservation (NYDEC) has recommended that the 2,000 MW Indian Point nuclear plant be retrofit to wet towers. NYDEC determined that a wet tower cost impact of less than 6 percent of revenue was not an unreasonable financial burden on the owner.[39] U.S. EPA has recommended that the 600 MW Oyster Bay nuclear plant be retrofit from once-through cooling to a wet cooling tower.[40]

- **Retrofitting to cooling towers will not jeopardize the safety or reliability of the nuclear plants**. One nuclear plant has already been cost-effectively and efficiently retrofit to closed-cycle wet cooling in the United States.[41] No modification was required to the core components of the nuclear plant. Many U.S. nuclear plants use wet cooling towers already, and a number of these plants are capable of switching between wet cooling towers and once-through cooling.[42]

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[33] *Id*.
[34] Grid Reliability Impacts, *supra* n. 5.
[35] An air-cooled combined cycle replacement project is proposed in Encina; an air-cooled combined cycle plant (Otay Mesa) will being operation near South Bay in 2009, PG&E is constructing an air-cooled combined cycle plant at Contra Costa, the Humboldt plant will be replaced with an internal combustion engine plant that does not use water for cooling, and the Potrero plant is proposed to be replaced with the San Francisco Electric Reliability Project, using combustion turbines that do not require cooling water. Listings for all proposed projects are available at: http://www.energy.ca.gov/sitingcases/alphabetical.html.
[36] Environmental Performance Report, *supra* n. 32 at p. 56-57.
[37] Grid Reliability Impacts, *supra* n. 5, Table 1-1, p.9.
[38] Alternative Cooling System Analysis, *supra* n. 27.
[39] New York Department of Environmental Conservation, *Fact Sheet - New York State Pollutant Discharge Elimination System (SPDES) Draft Permit Renewal With Modification,* Indian Point Electric Generating Station, Buchanan, NY - November 2003.
[40] J. Filippelli - EPA Region 2, comment letter to Nuclear Regulatory Commission on draft EIS for Oyster Bay Nuclear relicensing, September 7, 2006.
[41] Retrofitting to a wet tower is fundamentally simple - the once-through cooling pipes going to and from the ocean are rerouted to a cooling tower. At facilities that have been retrofit, the hook-up of the new cooling system has generally been carried-out without requiring an extended unscheduled outage. The cost to retrofit 800 MW Palisades Nuclear (MI) to wet towers was $68/kW (1999 dollars). [ref: EPA 316(b) Phase II Technical Development Document, Chapter 4].
[42] Prairie Island Nuclear (MN) and Vermont Yankee (VT) are two examples of nuclear plants designed to operate in closed-cycle with cooling towers or in open cycle with once-through cooling.

- **In addition to repowering, retirement of some of the once-through cooled plants might be a preferable option**. In its *2005 Integrated Energy Policy Report* the CEC called for studies to plan for the **retirement of the coastal steam-powered plants by 2012**.[43]

- To date, **four coastal power plants have voluntarily filed applications or license amendments with the California Energy Commission to switch from once-through cooling to air cooling**: El Segundo, Encina, Humboldt Bay, and Gateway (see attachment 2 below).

- **Two once-through cooling plants have already retired**: Hunters Point in San Francisco in 2006, and Long Beach combined cycle units in 2005.

4. PHASING OUT ONCE-THROUGH COOLING SUPPORTS CALIFORNIA'S LANDMARK INITIATIVES TO PROTECT MARINE ECOSYSTEMS AND THE DELTA, AND TO PROMOTE CLEAN, SUSTAINABLE, EFFICIENT ENERGY

- **The Governor's *Ocean Action Plan* asks the state to "increase the abundance and diversity of aquatic life in California's ocean, bays, estuaries, and coastal wetlands**."[44] Given that many power plants using once-through cooling are located in some of the most ecologically productive bays and estuaries on the coast, we must end the use of once-through cooling statewide in order to fully accomplish these goals.

- **The California Ocean Protection Act acknowledges that** "California's coastal and ocean resources are critical to the state's environmental and economic security" and that "the preservation of the state's ocean resources depends on healthy, productive, and resilient ocean ecosystems and that these resources should be governed by principles of sustainability, ecosystem health, precaution.[45]

- **The California Marine Life Protection Act**, the first law of its kind in the country, calls for the creation of a scientifically-based network of marine protected areas (MPAs) along the state's coastline in order to "protect the natural diversity and abundance of marine life, and the structure, function, and integrity of marine ecosystems."[46] The Initiative to implement MPAs in Southern California focuses on many of the ecologically important areas that are impacted by the concentration of once-through cooled plants in the region. To ensure actual protection for critical marine habitats and endangered, threatened, and protected species, we must be consistent across all regulatory processes. **The needless destruction of billions of fish larvae and the incidental take of threatened and endangered species off California's coast should be a thing of the past.**

- Billions of dollars have been spent to restore the Bay-Delta Estuary, but further action is needed, as illustrated in large part by litigation to protect threatened and endangered fish that are being pushed to extinction by water withdrawals and the impacts of once-through cooling systems in their paths. **California's Delta Vision Blue Ribbon Task Force and Bay-Delta Advisory Council process, among others, cannot fully succeed if OTC in the Delta is not addressed**.

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[43] 2005 Integrated Energy Policy Report, *supra*, n.18.
[44] Available at: http://www.resources.ca.gov/ocean/Cal_Ocean_Action_Strategy.pdf
[45] Available at: http://resources.ca.gov/copc/3-21-05_meeting/cal_ocean_protection_act.pdf
[46] California Fish and Game Code Section 2853(b)(1).

- **The majority of the once-through cooled power plants have higher emission rates of greenhouse gases and other pollutants compared to new generation sources** [47] but continue to operate despite this because the primary costs of their cooling systems are placed heavily on the environment and the public.

- **Phasing out once-through cooling will encourage modernization of the coastal steam plants**, which is a stated goal of California's Energy Action Plan and AB 1576 (Nunez, 2005).[48] **Phasing out once-through cooling also supports California's progress toward reducing greenhouse gases** per AB 32 (Nunez), the California Global Warming Solutions Act of 2006.

- **California has the right and responsibility to protect the beneficial uses of all of the state's waters for current and future residents, and has authority under state law to go beyond federal minimum standards** to accomplish this goal.

[47] Old Thermal Generation Retirement and Replacement, *supra* n. 24 at p.1.
[48] AB 1576 (Nunez, 2005) authorizes utilities to enter into long-term contracts for the electricity generated from the replacement or repowering of older, less-efficient electric generating facilities.

Attachment 1

Table excerpted from California Energy Commission, *2007 Environmental Performance Report of California's Electrical Generation System*, Draft Staff Report, CEC Report No. 700-2007-016-SD, ("2007 Environmental Performance Report") at p. 54. Available at*:* http://www.energy.ca.gov/2007publications/CEC-700-2007-016/CEC-700-2007-016-SD.PDF..

Table 16: 2006-2007 Operations Data for the Coastal Power Plant Fleet

Power Plants	2006 Capacity[1] (MW)	2006 Generation (GWh)	2006 Capacity Factor[2] %	2001 Capacity Factor %	2007 RMR Contract[3] (MW)
Alamitos	1,970	1,677	9.7	47	
Contra Costa	680	139	2.3	55.8	
Diablo Canyon (Nuclear)	2,202	18,465	95.7	94.1	
El Segundo	670	617	10.5	32.7	
Encina	965	1,255	14.8	46.5	946
Harbor	462	210	5.2	25.5	
Haynes[4]	1,606	3,482	24.7	24.1	
Humboldt Bay	137	441	36.8	56.1	106
Huntington Beach	1,013	1,141	12.9	14.9	
Mandalay	573	315	6.3	42.2	
Morro Bay	912	324	4.1	51.7	
Moss Landing[4]	2,484	6,405	29.4	68.5	
Ormond Beach	1,613	473	3.3	45.7	
Pittsburg	1,370	447	3.7	57.9	
Potrero	363	555	17.4	36.3	362
Redondo Beach	1,343	583	5	53.7	
San Onofre (Nuclear)	2,254	13,570	68.7	76.7	
Scattergood	803	1,498	21.3	24.8	
South Bay	709	959	15.5	31.8	689
Totals	**21,250**	**52,557**			**2,103**

Sources: Generation and Capacity, Energy Commission Quarterly Fuels Energy Report Database
RMR Contract Status, California ISO 2007 Local Area Reliability / RMR Contract Status Report

Notes: [1] These capacity figures are only for the steam boiler, combined cycle and nuclear units that use once-through cooling. Many of the coastal power plant sites also have combustion turbine peakers, which do not require cooling water.

[2] Capacity factors indicate annual generation as a proportion of total possible annual generation if the plant were to operate at full capacity for all 8,760 hours in a year. "Capacity factor" should not be confused with the capacity provided by coastal power plants during periods of peak demand, when all available capacity is needed to ensure resource adequacy and grid reliability.

[3] This column shows only the California ISO RMR contracts needed for local reliability. It does not include the new "local capacity requirements" because those designations are deemed proprietary. It is assumed that several more coastal power plants are included in the local capacity requirements.

[4] Haynes and Moss Landing both have partially repowered to combined cycle units, while retaining some of the older steam boiler capacity. Moss Landing's 1,060 MW combined cycle units ran at a 56 percent capacity factor in 2006.

Attachment 2

Status of California Power Plants Phasing Out Once-Through Cooling

Plant	**Owner**	**Location**	**Announced Plans**
El Segundo	NRG	Santa Monica Bay	Filed license amendment with CEC to repower 630MW using air cooling.
Encina	NRG	San Diego	Intends to repower 3 units with 550MW combined cycle plant using air cooling.
Humboldt Bay	PG&E	Humboldt Bay	Filed application to repower with 163MW internal combustion engines using radiator cooling.
Gateway[49]	PG&E	SF Bay-Delta	Filed license amendment with CEC to switch to air cooling for 530MW unit.

[49] Formally Contra Costa Unit 8.